

0041.ST25
SEQUENCE LISTING

<110> Delagrave, Simon
Marrs, Barry

<120> Methods For The Synthesis Of Polynucleotides And Combinatorial Libraries Of Polynucleotides

<130> HER0041

<160> 85

<170> PatentIn version 3.0

<210> 1

<211> 377

<212> PRT

<213> Bacillus alcalophilus

<400> 1

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Glu Lys Tyr Leu Ile Gly Phe Asn Glu Gln Glu Ala Val Ser Glu Phe
 35          40          45

Val Glu Ala Asn Asp Glu Val Ala Ile Leu Ser Glu Glu Glu Val
 50          55          60

Glu Ile Glu Leu Leu His Glu Phe Glu Thr Ile Pro Val Leu Ser Val
 65          70          75          80

Glu Leu Ser Pro Glu Asp Val Asp Ala Leu Glu Leu Asp Pro Ala Ile
 85          90          95

Ser Tyr Ile Glu Glu Asp Ala Glu Val Thr Thr Met Ala Gln Ser Val
100          105          110

Pro Trp Gly Ile Ser Arg Val Gln Ala Pro Ala Ala His Asn Arg Gly
115          120          125

Leu Thr Gly Ser Gly Val Lys Val Ala Val Leu Asp Thr Gly Ile Ser
130          135          140

Thr His Pro Asp Leu Asn Ile Arg Gly Gly Ala Ser Phe Val Pro Gly
145          150          155          160

Glu Pro Ser Thr Gln Asp Gly Asn Gly His Gly Thr His Val Ala Gly
165          170          175

Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val Leu Gly Val Ala Pro
180          185          190

Asn Ala Glu Leu Tyr Ala Val Lys Val Leu Gly Ala Ser Gly Ser Gly
195          200          205

Ser Val Ser Ser Ile Ala Gln Gly Leu Glu Trp Ala Gly Asn Asn Gly
210          215          220

Met His Val Ala Asn Leu Ser Leu Gly Ser Pro Ser Pro Ser Ala Thr
225          230          235          240
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Leu Glu Gln Ala Val Asn Ser Ala Thr Ser Arg Gly Val Leu Val Val
245 250 255

Ala Ala Ser Gly Asn Ser Gly Ala Gly Ser Ile Ser Tyr Pro Ala Arg
260 265 270

Tyr Ala Asn Ala Met Ala Val Gly Ala Thr Asp Gln Asn Asn Asn Arg
275 280 285

Ala Ser Phe Ser Gln Tyr Gly Ala Gly Leu Asp Ile Val Ala Pro Gly
290 295 300

Val Asn Val Gln Ser Thr Tyr Pro Gly Ser Thr Tyr Ala Ser Leu Asn
305 310 315 320

Gly Thr Ser Met Ala Thr Pro His Val Ala Gly Ala Ala Ala Leu Val
325 330 335

Lys Gln Lys Asn Pro Ser Trp Ser Asn Val Gln Ile Arg Asn His Leu
340 345 350

Lys Asn Thr Ala Thr Ser Leu Gly Ser Thr Asn Leu Tyr Gly Ser Gly
355 360 365

Leu Val Asn Ala Glu Ala Ala Thr Arg
370 375

<210> 2

<211> 271

<212> PRT

<213> Bacillus lentus

<400> 2

Ala Gln Ser Val Pro Trp Gly Ile Ser Arg Val Gln Ala Pro Ala Ala
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His Asn Arg Gly Leu Thr Gly Ser Gly Val Lys Val Ala Val Leu Asp
20 25 30

Thr Gly Ile Ser Thr His Pro Asp Leu Asn Ile Arg Gly Gly Ala Ser
35 40 45

Phe Val Pro Gly Glu Pro Ser Thr Gln Asp Gly Asn Gly His Gly Thr
50 55 60

His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val Leu
65 70 75 80

Gly Val Ala Pro Ser Ala Glu Leu Tyr Ala Val Lys Val Leu Gly Ala
85 90 95

Ser Gly Ser Gly Ser Gly Ser Val Ser Ser Ile Ala Gln Gly Leu Glu
100 105 110

Trp Ala Gly Asn Asn Gly Met His Val Ala Asn Leu Ser Leu Gly Ser
115 120 125

Pro Ser Pro Ser Ala Thr Leu Glu Gln Ala Val Asn Ser Ala Thr Ser
130 135 140

Arg Gly Val Leu Val Val Ala Ala Ser Gly Asn Ser Gly Ala Gly Ser
145 150 155 160

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Ile Ser Tyr Pro Ala Arg Tyr Ala Asn Ala Met Ala Val Gly Ala Thr
165 170 175
Asp Gln Asn Asn Asn Arg Ala Ser Phe Ser Gln Tyr Gly Ala Gly Leu
180 185 190
Asp Ile Val Ala Pro Gly Val Asn Val Gln Ser Thr Tyr Pro Gly Ser
195 200 205
Thr Tyr Ala Ser Leu Asn Gly Thr Ser Met Ala Thr Pro His Val Ala
210 215 220
Gly Ala Ala Ala Leu Val Lys Gln Lys Asn Pro Ser Trp Ser Asn Val
225 230 235 240
Gln Ile Arg Asn His Leu Lys Asn Thr Ala Thr Ser Leu Gly Ser Thr
245 250 255
Asn Leu Tyr Gly Ser Gly Leu Val Asn Ala Glu Ala Ala Thr Arg
260 265 270
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<213> Bacillus sp. KSM-K16
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His Asn Arg Gly Leu Thr Gly Ser Gly Val Lys Val Ala Val Leu Asp
20 25 30
Thr Gly Ile Ser Thr His Pro Asp Leu Asn Ile Arg Gly Gly Ala Ser
35 40 45
Phe Val Pro Gly Glu Pro Ser Thr Gln Asp Gly Asn Gly His Gly Thr
50 55 60
His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val Leu
65 70 75 80
Gly Val Ala Pro Ser Ala Glu Leu Tyr Ala Val Lys Val Leu Gly Ala
85 90 95
Ser Gly Ser Gly Ser Val Ser Ser Ile Ala Gln Gly Leu Glu Trp Ala
100 105 110
Gly Asn Asn Gly Met His Val Ala Asn Leu Ser Leu Gly Ser Pro Ser
115 120 125
Pro Ser Ala Thr Leu Glu Gln Ala Val Asn Ser Ala Thr Ser Arg Gly
130 135 140
Val Leu Val Val Ala Ala Ser Gly Asn Ser Gly Ala Gly Ser Ile Ser
145 150 155 160
Tyr Pro Ala Arg Tyr Ala Asn Ala Met Ala Val Gly Ala Thr Asp Gln
165 170 175
Asn Asn Asn Arg Ala Ser Phe Gln Tyr Gly Ala Gly Leu Asp Ile Val
180 185 190
Ala Pro Gly Val Asn Val Gln Ser Thr Tyr Pro Gly Ser Thr Tyr Ala

195 200 205

Ser Leu Asn Gly Thr Ser Met Ala Thr Pro His Val Ala Gly Val Ala
210 215 220

Ala Ala Leu Val Lys Gln Lys Asn Pro Ser Trp Ser Asn Val Gln Ile
225 230 235 240

Arg Asn His Leu Lys Asn Thr Ala Thr Gly Leu Gly Asn Thr Asn Leu
245 250 255

Tyr Gly Ser Gly Leu Val Asn Ala Glu Ala Ala Thr Arg
260 265

<210> 4
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<213> Bacillus lentus

<220>
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<400> 4

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20 25 30

Thr Gly Ile Ser Thr His Pro Asp Leu Asn Ile Arg Gly Gly Ala Ser
35 40 45

Phe Val Pro Gly Glu Pro Ser Thr Gln Asp Gly Asn Gly His Gly Thr
50 55 60

His Val Ala Gly Thr Ile Ala Ala Leu Asp Asn Ser Ile Gly Val Leu
65 70 75 80

Gly Val Ala Pro Ser Ala Glu Leu Tyr Ala Val Lys Val Leu Gly Ala
85 90 95

Ser Gly Ser Gly Ala Ile Ser Ser Ile Ala Gln Gly Leu Glu Trp Ala
100 105 110

Gly Asn Asn Gly Met His Val Ala Asn Leu Ser Leu Gly Ser Pro Ser
115 120 125

Pro Ser Ala Thr Leu Glu Gln Ala Val Asn Ser Ala Thr Ser Arg Gly
130 135 140

Val Leu Val Val Ala Ala Ser Gly Asn Ser Gly Ala Gly Ser Ile Ser
145 150 155 160

Tyr Pro Ala Arg Tyr Ala Asn Ala Met Ala Val Gly Ala Thr Asp Gln
165 170 175

Asn Asn Asn Arg Ala Ser Phe Ser Gln Tyr Gly Ala Gly Leu Asp Ile
180 185 190

Val Ala Pro Gly Val Asn Val Gln Ser Thr Tyr Pro Gly Ser Thr Tyr
195 200 205

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Ala Ser Leu Asn Gly Thr Xaa Met Ala Thr Pro His Val Ala Gly Ala
210 215 220

Ala Ala Leu Val Lys Gln Lys Asn Pro Ser Trp Ser Asn Val Gln Ile
225 230 235 240

Arg Asn His Leu Lys Asn Thr Ala Thr Ser Leu Gly Ser Thr Asn Leu
245 250 255

Tyr Gly Ser Gly Leu Val Asn Ala Glu Ala Ala Thr Arg
260 265

<210> 5

<211> 269

<212> PRT

<213> Bacillus lentus

<400> 5

Ala Gln Ser Val Pro Trp Gly Ile Ser Arg Val Gln Ala Pro Ala Ala
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His Asn Arg Gly Leu Thr Gly Ser Gly Val Lys Val Ala Val Leu Asp
20 25 30

Thr Gly Ile Ser Thr His Pro Asp Leu Asn Ile Arg Gly Gly Ala Ser
35 40 45

Phe Val Pro Gly Glu Pro Ser Thr Gln Asp Gly Asn Gly His Gly Thr
50 55 60

His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val Leu
65 70 75 80

Gly Val Ala Pro Ser Ala Glu Leu Tyr Ala Val Lys Val Leu Gly Ala
85 90 95

Asp Gly Arg Gly Ala Ile Ser Ser Ile Ala Gln Gly Leu Glu Trp Ala
100 105 110

Gly Asn Asn Gly Met His Val Ala Asn Leu Ser Leu Gly Ser Pro Ser
115 120 125

Pro Ser Ala Thr Leu Glu Gln Ala Val Asn Ser Ala Thr Ser Arg Gly
130 135 140

Val Leu Val Val Ala Ala Ser Gly Asn Ser Gly Ala Ser Ser Ile Ser
145 150 155 160

Tyr Pro Ala Arg Tyr Ala Asn Ala Met Ala Val Gly Ala Thr Asp Gln
165 170 175

Asn Asn Asn Arg Ala Ser Phe Ser Gln Tyr Gly Ala Gly Leu Asp Ile
180 185 190

Val Ala Pro Gly Val Asn Val Gln Ser Thr Tyr Pro Gly Ser Thr Tyr
195 200 205

Ala Ser Leu Asn Gly Thr Ser Met Ala Thr Pro His Val Ala Gly Ala
210 215 220

Ala Ala Leu Val Lys Gln Lys Asn Pro Ser Trp Ser Asn Val Gln Ile
225 230 235 240

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Arg Asn His Leu Lys Asn Thr Ala Thr Ser Leu Gly Ser Thr Asn Leu

245 250 255

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<210> 6
<211> 379
<212> PRT
<213> Bacillus sp.
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Met Asn Lys Lys Met Gly Lys Ile Val Ala Gly Thr Ala Leu Ile Ile
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Glu Lys Tyr Leu Ile Gly Phe Lys Glu Gln Glu Val Met Ser Gln Phe
35 40 45

Glu Asp Val Glu Ile Asp Leu Leu His Glu Phe Asp Phe Ile Pro Val
65 70 75 80

Pro Ala Ile Ser Tyr Ile Glu Glu Asp Ala Glu Val Thr Thr Met Gln
100 105 110

Arg Gly Phe Thr Gly Thr Gly Val Arg Val Ala Val Leu Asp Thr Gly
130 135 140

Pro Gly Glu Pro Asn Ile Ser Asp Gly Asn Gly His Gly Thr His Val
165 170 175

Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val Leu Gly Val
180 185 190

Ala Pro Asn Val Asp Leu Tyr Gly Val Lys Val Leu Gly Ala Ser Gly
195 200 205

Ser Gly Ser Ile Ser Gly Ile Ala Gln Gly Leu Gln Trp Ala Ala Asn
210 215 220

Asn Gly Met His Ile Ala Asn Met Ser Leu Gly Ser Ser Ser Ala Gly
225 230 235 240

Ser Ala Thr Met Glu Gln Ala Val Asn Gln Ala Thr Ala Ser Gly Val
245 250 255

Leu Val Val Ala Ala Ser Gly Asn Ser Gly Ala Gly Asn Val Gly Phe
260 265 270

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                                0041.ST25
                                285
275                               280
Asn Asn Arg Ala Ser Phe Ser Gln Tyr Gly Ala Gly Leu Asp Ile Val
290                               295                               300

Ala Pro Gly Val Gly Val Gln Ser Thr Val Pro Gly Asn Gly Tyr Ser
305                               310                               315                               320

Ser Phe Asn Gly Thr Ser Met Ala Thr Pro His Val Ala Val Gly Ala
325                               330                               335

Ala Leu Val Lys Gln Lys Asn Pro Ser Trp Ser Asn Val Gln Ile Arg
340                               345                               350

Asn His Leu Lys Asn Thr Ala Thr Asn Leu Gly Asn Thr Asn Gln Phe
355                               360                               365

Ser Gly Leu Val Asn Ala Glu Ala Ala Thr Arg
370                               375

<210> 7
<211> 382
<212> PRT
<213> Bacillus sp.

<400> 7

Met Lys Lys Leu Phe Thr Lys Val Val Ala Ser Ala Ala Leu Leu Leu
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Gln Tyr Leu Ile Gly Phe Glu Asn Gln Leu Gln Val Thr Glu Phe Val
35                               40                               45

Glu Ser Ser Asp Lys Gly Gln Ser Glu Met Ser Leu Phe Ala Glu Val
50                               55                               60

Asn Asp Glu Ser Ile Glu Met Glu Leu Leu Tyr Glu Phe Glu Asp Ile
65                               70                               75                               80

Pro Val Val Ser Val Glu Leu Ser Pro Glu Asp Val Lys Asp Leu Glu
85                               90                               95

Lys Asp Pro Ser Ile Thr Tyr Ile Glu Glu Asp Ile Glu Val Thr Ile
100                              105                              110

Thr Asn Gln Val Thr Pro Trp Gly Ile Thr Arg Val Gln Ala Pro Thr
115                              120                              125

Ala Trp Thr Arg Gly Tyr Thr Gly Thr Gly Val Arg Val Ala Val Leu
130                              135                              140

Asp Thr Gly Ile Ser Thr His Pro Asp Leu Asn Ile Arg Gly Gly Val
145                              150                              155                              160

Ser Phe Val Pro Gly Glu Pro Ser Tyr Gln Asp Gly Asn Gly His Gly
165                              170                              175

Thr His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val
180                              185                              190

Val Gly Val Ala Pro Asn Ala Glu Leu Tyr Ala Val Lys Val Leu Gly
195                              200                              205

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Val Ala Val Leu Asp Thr Gly Val Ala Pro His Pro Asp Leu His Ile
130 135 140
Arg Gly Gly Val Ala Ser Phe Ile Ser Thr Glu Asn Thr Tyr Val Asp
145 150 155 160
Tyr Asn Gly His Gly Thr His Val Ala Gly Thr Val Ala Ala Leu Asn
165 170 175
Asn Ser Tyr Gly Val Leu Gly Val Ala Pro Gly Ala Glu Leu Tyr Ala
180 185 190
Val Lys Val Leu Asp Arg Asn Gly Ser Gly Ser His Ala Ser Ile Ala
195 200 205
Gln Gly Ile Glu Trp Ala Met Asn Asn Gly Met Asp Ile Ala Asn Met
210 215 220
Ser Leu Gly Ser Pro Ser Gly Ser Thr Thr Leu Gln Leu Ala Ala Asp
225 230 235 240
Arg Ala Arg Asn Ala Gly Val Leu Leu Ile Gly Ala Ala Gly Asn Ser
245 250 255
Gly Gln Gln Gly Gly Ser Asn Asn Met Gly Tyr Pro Ala Arg Tyr Ala
260 265 270
Ser Val Met Ala Val Gly Ala Val Asp Gln Asn Gly Asn Arg Ala Asn
275 280 285
Phe Ser Ser Tyr Gly Ser Glu Leu Glu Ile Met Ala Pro Gly Val Asn
290 295 300
Ile Asn Ser Thr Tyr Leu Asn Asn Gly Tyr Arg Ser Leu Asn Gly Thr
305 310 315 320
Ser Met Ala Ser Pro His Val Ala Gly Val Ala Ala Leu Val Lys Gln
325 330 335
Lys His Pro His Leu Thr Ala Ala Gln Ile Arg Asn Arg Met Asn Gln
340 345 350
Thr Ala Ile Pro Leu Gly Asn Ser Thr Tyr Tyr Gly Asn Gly Leu Val
355 360 365
Asp Ala Glu Tyr Ala Ala Gln
370 375

<210> 9
<211> 372
<212> PRT
<213> Bacillus licheniformis

<400> 9

Met Met Arg Lys Lys Ser Phe Trp Leu Gly Met Leu Thr Ala Phe Met
1 5 10 15
Leu Val Phe Thr Met Ala Phe Ser Asp Ser Ala Ser Ala Ala Gln Pro
20 25 30
Ala Lys Asn Val Glu Lys Asp Tyr Ile Val Gly Phe Lys Ser Gly Val
35 40 45
Lys Thr Ala Ser Val Lys Lys Asp Ile Ile Lys Glu Ser Gly Gly Lys

60

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<212>	PRT

<213> Bacillus licheniformis

<400> 10

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Met Met Arg Lys Lys Ser Phe Trp Leu Gly Met Leu Thr Ala Phe Met
 1          5          10          15
Leu Val Phe Thr Met Ala Phe Ser Asp Ser Ala Ser Ala Ala Gln Pro
 20          25          30
Ala Lys Asn Val Glu Lys Asp Tyr Ile Val Gly Phe Lys Ser Gly Val
 35          40          45
Lys Thr Ala Ser Val Lys Lys Asp Ile Ile Lys Glu Ser Gly Gly Lys
 50          55          60
Val Asp Lys Gln Phe Arg Ile Ile Asn Ala Ala Lys Ala Lys Leu Asp
 65          70          75          80
Lys Glu Ala Leu Lys Glu Val Lys Asn Asp Pro Asp Val Ala Tyr Val
 85          90          95
Glu Glu Asp His Val Ala His Ala Leu Ala Gln Thr Val Pro Tyr Gly
100          105          110
Ile Pro Leu Ile Lys Ala Asp Lys Val Gln Ala Gln Gly Phe Lys Gly
115          120          125
Ala Asn Val Lys Val Ala Val Leu Asp Thr Gly Ile Gln Ala Ser His
130          135          140
Pro Asp Leu Asn Val Val Gly Gly Ala Ser Phe Val Ala Gly Glu Ala
145          150          155          160
Tyr Asn Thr Asp Gly Asn Gly His Gly Thr His Val Ala Gly Thr Val
165          170          175
Ala Ala Leu Asp Asn Thr Thr Gly Val Leu Gly Val Ala Pro Ser Val
180          185          190
Ser Leu Tyr Ala Val Lys Val Leu Asn Ser Ser Gly Ser Gly Thr Tyr
195          200          205
Ser Gly Ile Val Ser Gly Ile Glu Trp Ala Thr Thr Asn Gly Met Asp
210          215          220
Val Ile Asn Met Ser Leu Gly Gly Pro Ser Gly Ser Thr Ala Met Lys
225          230          235          240
Gln Ala Val Asp Asn Ala Tyr Ala Arg Gly Val Val Val Val Ala Ala
245          250          255
Ala Gly Asn Ser Gly Ser Ser Gly Asn Thr Asn Thr Ile Gly Tyr Pro
260          265          270
Ala Lys Tyr Asp Ser Val Ile Ala Val Gly Ala Val Asp Ser Asn Ser
275          280          285
Asn Arg Ala Ser Phe Ser Ser Val Gly Ala Glu Leu Glu Val Met Ala
290          295          300
Pro Gly Ala Gly Val Tyr Ser Thr Tyr Pro Thr Ser Thr Tyr Ala Thr
305          310          315          320
Leu Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly Ala Ala Ala

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325

330

335

Leu Ile Leu Ser Lys His Pro Asn Leu Ser Ala Ser Gln Val Arg Asn
 340 345 350

Arg Leu Ser Ser Thr Ala Thr Tyr Leu Gly Ser Ser Phe Tyr Tyr Gly
 355 360 365

Lys Gly Leu Ile Asn Val Glu Ala Ala Ala Gln
 370 375

<210> 11

<211> 379

<212> PRT

<213> Bacillus licheniformis

<400> 11

Met Met Arg Lys Lys Ser Phe Trp Leu Gly Met Leu Thr Ala Leu Met
 1 5 10 15

Leu Val Phe Thr Met Ala Phe Ser Asp Ser Ala Ser Ala Ala Gln Pro
 20 25 30

Ala Lys Asn Val Glu Lys Asp Tyr Ile Val Gly Phe Lys Ser Gly Val
 35 40 45

Lys Thr Ala Ser Val Lys Lys Asp Ile Ile Lys Glu Ser Gly Gly Lys
 50 55 60

Val Asp Lys Gln Phe Arg Ile Ile Asn Ala Ala Lys Ala Lys Leu Asp
 65 70 75 80

Lys Glu Ala Leu Glu Glu Val Lys Asn Asp Pro Asp Val Ala Tyr Val
 85 90 95

Glu Glu Asp His Val Ala His Ala Leu Ala Gln Thr Val Pro Tyr Gly
 100 105 110

Ile Pro Leu Ile Lys Ala Asp Lys Val Gln Ala Gln Gly Tyr Lys Gly
 115 120 125

Ala Asn Val Lys Val Ala Val Leu Asp Thr Gly Ile Gln Ala Ser His
 130 135 140

Pro Asp Leu Asn Val Val Gly Gly Ala Ser Phe Val Ala Gly Glu Ala
 145 150 155 160

Tyr Asn Thr Asp Gly Asn Gly His Gly Thr His Val Ala Gly Thr Val
 165 170 175

Ala Ala Leu Asp Asn Thr Thr Gly Val Leu Gly Val Ala Pro Asn Val
 180 185 190

Ser Leu Tyr Ala Val Lys Val Leu Asn Ser Ser Gly Ser Gly Ser Tyr
 195 200 205

Ser Gly Ile Val Ser Gly Ile Glu Trp Ala Thr Thr Asn Gly Met Asp
 210 215 220

Val Ile Asn Met Ser Leu Gly Gly Pro Ser Gly Ser Thr Ala Met Lys
 225 230 235 240

Gln Ala Val Asp Asn Ala Tyr Ala Arg Gly Val Val Val Val Ala Ala
 245 250 255

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Ala Gly Asn Ser Gly Ser Ser Gly Asn Thr Asn Thr Ile Gly Tyr Pro
 260 265 270

Ala Lys Tyr Asp Ser Val Ile Ala Val Gly Ala Val Asp Ser Asn Ser
 275 280 285

Asn Arg Ala Ser Phe Ser Ser Val Gly Ala Glu Leu Glu Val Met Ala
 290 295 300

Pro Gly Ala Gly Val Tyr Ser Thr Tyr Pro Thr Ser Thr Tyr Ala Thr
 305 310 315 320

Leu Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly Ala Ala Ala
 325 330 335

Leu Ile Leu Ser Lys His Pro Asn Leu Ser Ala Ser Gln Val Arg Asn
 340 345 350

Arg Leu Ser Ser Thr Ala Thr Tyr Leu Gly Ser Ser Phe Tyr Tyr Gly
 355 360 365

Lys Gly Leu Ile Asn Val Glu Ala Ala Ala Gln
 370 375

<210> 12

<211> 379

<212> PRT

<213> Bacillus licheniformis

<400> 12

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Leu Val Phe Thr Met Ala Phe Ser Asp Ser Ala Ser Ala Ala Gln Pro
 20 25 30

Ala Lys Asn Val Glu Lys Asp Tyr Ile Val Gly Phe Lys Ser Gly Val
 35 40 45

Lys Thr Ala Ser Val Lys Lys Asp Ile Ile Lys Glu Ser Gly Gly Lys
 50 55 60

Val Asp Lys Gln Phe Arg Ile Ile Asn Ala Ala Lys Ala Lys Leu Asp
 65 70 75 80

Lys Glu Ala Leu Lys Glu Val Lys Asn Asp Pro Asp Val Ala Tyr Val
 85 90 95

Glu Glu Asp His Val Gly His Gly Leu Gly Gln Thr Val Pro Tyr Gly
 100 105 110

Ile Pro Leu Ile Lys Ala Asp Lys Val Gln Ala Gln Gly Phe Lys Gly
 115 120 125

Ala Asn Val Lys Val Ala Val Leu Asp Thr Gly Ile Gln Ala Ser His
 130 135 140

Pro Asp Leu Asn Val Val Gly Gly Ala Ser Phe Val Ala Gly Glu Ala
 145 150 155 160

Tyr Asn Thr Asp Gly Asn Gly His Gly Thr His Val Ala Gly Thr Val
 165 170 175

Ala Ala Leu Asp Asn Thr Thr Gly Val Leu Gly Val Ala Pro Ser Val
180 185 190

Ser Leu Tyr Ala Val Lys Val Leu Asn Ser Ser Gly Ser Gly Ser Tyr
195 200 205

Ser Gly Ile Val Ser Gly Ile Glu Trp Val Thr Thr Asn Gly Met Asp
210 215 220

Val Ile Asn Met Ser Leu Gly Gly Ala Ser Gly Ser Thr Ala Met Lys
225 230 235 240

Gln Ala Val Asp Asn Ala Tyr Ala Arg Gly Val Val Val Val Ala Ala
245 250 255

Ala Gly Asn Ser Gly Ser Ser Gly Asn Thr Asn Thr Ile Gly Tyr Pro
260 265 270

Ala Lys Cys Asp Ser Val Ile Pro Val Gly Gly Glu Asp Ser Asn Ser
275 280 285

Asn Arg Ser Ser Phe Ser Ser Val Gly Ala Glu Leu Glu Val Met Ala
290 295 300

Pro Val Ser Gly Val Tyr Ser Thr Tyr Pro Thr Asn Thr Tyr Thr Thr
305 310 315 320

Leu Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly Thr Ser Ala
325 330 335

Leu Ile Leu Ser Lys His Pro Asn Leu Ser Ala Ser Gln Val Arg Asn
340 345 350

Arg Leu Ser Arg Thr Ala Thr Tyr Leu Gly Ser Ser Phe Tyr Tyr Gly
355 360 365

Lys Gly Leu Ile Asn Val Glu Ala Ala Ala Gln
370 375

<210> 13
<211> 379
<212> PRT
<213> Bacillus licheniformis
<400> 13

Met Met Arg Lys Lys Ser Phe Trp Leu Gly Met Leu Thr Ala Leu Met
1 5 10 15

Leu Val Phe Thr Met Ala Phe Ser Asp Ser Ala Ser Ala Ala Gln Pro
20 25 30

Gly Lys Asn Val Glu Lys Asp Tyr Ile Val Gly Phe Lys Ser Gly Val
35 40 45

Lys Thr Ala Ser Val Lys Lys Asp Ile Ile Lys Glu Ser Gly Gly Lys
50 55 60

Val Asp Lys Gln Phe Arg Ile Ile Asn Ala Gly Lys Ala Lys Leu Asp
65 70 75 80

Lys Glu Ala Leu Lys Glu Val Lys Asn Asp Pro Asp Val Ala Tyr Val
85 90 95

Glu Glu Asp His Val Ala His Val Leu Gly Gln Thr Val Pro Tyr Gly

100

105

110

Ile Pro Leu Ile Lys Ala Asp Lys Val Gln Ala Gln Gly Phe Lys Gly
 115 120 125
 Ala Asn Val Lys Val Ala Val Leu Asp Thr Gly Ile Gln Ala Ser His
 130 135 140
 Pro Asp Leu Asn Val Val Gly Gly Ala Ser Phe Val Ala Gly Glu Ala
 145 150 155 160
 Tyr Asn Thr Asp Gly Asn Gly His Gly Thr His Val Ala Gly Thr Val
 165 170 175
 Ala Ala Leu Asp Asn Thr Thr Gly Val Leu Gly Val Ala Pro Ser Val
 180 185 190
 Ser Leu Tyr Ala Val Lys Val Leu Asn Ser Ser Gly Ser Gly Ser Tyr
 195 200 205
 Ser Ala Ile Val Ser Gly Ile Glu Trp Ala Thr Thr Thr Gly Met Asp
 210 215 220
 Val Ile Asn Met Ser Leu Gly Gly Ala Ser Val Ser Thr Ala Met Lys
 225 230 235 240
 Gln Ala Val Asp His Ala Tyr Ala Arg Gly Ala Val Val Val Ser Ser
 245 250 255
 Ala Gly Asn Ser Gly Ser Ser Gly Asn Thr Asn Thr Ile Gly Tyr Pro
 260 265 270
 Ala Lys Tyr Asp Ser Val Ile Ala Val Gly Ala Val Asp Ser Asn Ser
 275 280 285
 Asn Arg Ala Ser Phe Ser Ser Val Gly Ala Glu Leu Glu Val Met Ala
 290 295 300
 Pro Gly Ala Gly Val Tyr Ser Thr Tyr Pro Thr Asn Thr Tyr Ala Thr
 305 310 315 320
 Leu Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly Ala Ala Ala
 325 330 335
 Leu Ile Leu Ser Lys His Pro Asn Leu Ser Ala Ser Gln Val Arg Thr
 340 345 350
 Arg Leu Ser Arg Thr Ala Thr Tyr Leu Gly Ser Ser Phe Ser Tyr Gly
 355 360 365
 Arg Gly Leu Ile Asn Val Glu Ala Ala Ala Gln
 370 375

<210> 14

<211> 378

<212> PRT

<213> Bacillus licheniformis

<400> 14

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 Leu Val Phe Thr Met Glu Phe Ser Asp Ser Ala Ser Ala Ala Gln Pro
 20 25 30

370

375

<210> 15
 <211> 310
 <212> PRT
 <213> Bacillus licheniformis

<400> 15

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 Glu Val Lys Asn Asp Pro Asp Val Ala Tyr Val Glu Glu Asp His Val
 20 25 30
 Ala His Ala Leu Ala Gln Thr Val Pro Tyr Gly Ile Pro Leu Ile Lys
 35 40 45
 Ala Asp Lys Val Gln Ala Gln Gly Tyr Lys Gly Ala Asn Val Lys Val
 50 55 60
 Ala Val Leu Asp Thr Gly Ile Gln Ala Ser His Pro Asp Leu Asn Val
 65 70 75 80
 Val Gly Gly Ala Ser Phe Val Ala Gly Glu Ala Tyr Asn Thr Asp Gly
 85 90 95
 Asn Gly His Gly Thr His Val Ala Gly Thr Val Ala Ala Leu Asp Asn
 100 105 110
 Thr Thr Gly Val Leu Gly Val Ala Pro Asn Val Ser Leu Tyr Ala Val
 115 120 125
 Lys Val Leu Asn Ser Ser Gly Ser Gly Ser Tyr Ser Gly Ile Val Ser
 130 135 140
 Gly Ile Glu Trp Ala Thr Thr Asn Gly Met Asp Val Ile Asn Met Ser
 145 150 155 160
 Leu Gly Gly Ala Ser Gly Ser Thr Ala Met Lys Gln Ala Val Asp Asn
 165 170 175
 Ala Tyr Ala Arg Gly Val Val Val Val Ala Ala Ala Gly Asn Ser Gly
 180 185 190
 Ser Ser Gly Asn Thr Asn Thr Ile Gly Tyr Pro Ala Lys Tyr Asp Ser
 195 200 205
 Val Ile Ala Val Gly Ala Val Asp Ser Asn Ser Asn Arg Ala Ser Phe
 210 215 220
 Ser Ser Val Gly Ala Glu Leu Glu Val Met Ala Pro Gly Ala Gly Val
 225 230 235 240
 Tyr Ser Thr Tyr Pro Thr Ser Thr Tyr Ala Thr Leu Asn Gly Thr Ser
 245 250 255
 Met Ala Ser Pro His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys
 260 265 270
 His Pro Asn Leu Ser Ala Ser Gln Val Arg Asn Arg Leu Ser Ser Thr
 275 280 285
 Ala Thr Tyr Leu Gly Ser Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn
 290 295 300

Val Glu Ala Ala Ala Gln
305 310

<210> 16
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<213> Bacillus subtilis var. natto

<400> 16

Met Arg Ser Lys Lys Leu Trp Ile Ser Leu Leu Phe Ala Leu Thr Leu
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Ile Phe Thr Met Ala Phe Ser Asn Met Ser Ala Gln Ala Ala Gly Lys
20 25 30

Ser Ser Thr Glu Lys Lys Tyr Ile Val Gly Phe Lys Gln Thr Met Ser
35 40 45

Ala Met Ser Ser Ala Lys Lys Lys Asp Val Ile Ser Glu Lys Gly Gly
50 55 60

Lys Val Gln Lys Gln Phe Lys Tyr Val Asn Ala Ala Ala Thr Leu
65 70 75 80

Asp Glu Lys Ala Val Lys Glu Leu Lys Lys Asp Pro Ser Val Ala Tyr
85 90 95

Val Glu Glu Asp His Ile Ala His Glu Tyr Ala Gln Ser Val Pro Tyr
100 105 110

Gly Ile Ser Gln Ile Lys Ala Pro Ala Leu His Ser Gln Gly Tyr Thr
115 120 125

Gly Ser Asn Val Lys Val Ala Val Ile Asp Ser Gly Ile Asp Ser Ser
130 135 140

His Pro Asp Leu Asn Val Arg Gly Gly Ala Ser Phe Val Pro Ser Glu
145 150 155 160

Thr Asn Pro Tyr Gln Asp Gly Ser Ser His Gly Thr His Val Ala Gly
165 170 175

Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly Val Leu Gly Val Ala Pro
180 185 190

Ser Ala Ser Leu Tyr Ala Val Lys Val Leu Asp Ser Thr Gly Ser Gly
195 200 205

Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu Trp Ala Ile Ser Asn Asn
210 215 220

Met Asp Val Ile Asn Met Ser Leu Gly Gly Pro Thr Gly Ser Thr Ala
225 230 235 240

Leu Lys Thr Val Val Asp Lys Ala Val Ser Ser Gly Ile Val Val Ala
245 250 255

Ala Ala Ala Gly Asn Glu Gly Ser Ser Gly Ser Thr Ser Thr Val Gly
260 265 270

Tyr Pro Ala Lys Tyr Pro Ser Thr Ile Ala Val Gly Ala Val Asn Ser
275 280 285

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Ser Asn Gln Arg Ala Ser Phe Ser Ser Val Gly Ser Glu Leu Asp Val
290 295 300

Met Ala Pro Gly Val Ser Ile Gln Ser Ser Thr Leu Pro Gly Gly Thr
305 310 315 320

Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Thr His Val Ala Gly Ala
325 330 335

Ala Ala Leu Ile Leu Ser His Pro Thr Trp Thr Asn Ala Gln Val Arg
340 345 350

Asp Arg Leu Glu Ser Thr Ala Thr Tyr Leu Gly Asn Ser Phe Tyr Tyr
355 360 365

Gly Lys Gly Leu Ile Asn Val Gln Ala Ala Ala Gln
370 375 380

<210> 17

<211> 274

<212> PRT

<213> Bacillus subtilis

<400> 17

Ala Gln Ser Val Pro Tyr Gly Ile Ser Gln Ile Lys Ala Pro Ala Leu
1 5 10 15

His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp
20 25 30

Ser Gly Ile Asp Ser Ser His Pro Asp Leu Asn Val Arg Gly Gly Ala
35 40 45

Ser Phe Val Pro Ser Glu Thr Asn Pro Tyr Gln Asp Gly Ser Ser His
50 55 60

Gly Thr His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly
65 70 75 80

Val Leu Gly Val Pro Ser Ala Ser Leu Tyr Ala Val Lys Val Leu Asp
85 90 95

Ser Thr Gly Ser Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu Trp
100 105 110

Ala Ile Ser Asn Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly Pro
115 120 125

Thr Gly Ser Thr Ala Leu Lys Thr Val Val Asp Lys Ala Val Ser Ser
130 135 140

Gly Ile Val Val Ala Ala Ala Gly Asn Glu Gly Ser Ser Gly Ser
145 150 155 160

Thr Ser Thr Val Gly Tyr Pro Ala Lys Tyr Pro Ser Thr Ile Ala Val
165 170 175

Gly Ala Val Asn Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Ala Gly
180 185 190

Ser Glu Leu Asp Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr Leu
195 200 205

Pro Gly Gly Thr Tyr Gly Ala Tyr Asn Gly Thr Cys Met Ala Thr Pro

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220

210

215

His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys His Pro Thr Trp
225 230 235 240

Thr Asn Ala Gln Val Arg Asp Arg Leu Glu Ser Thr Ala Thr Tyr Leu
245 250 255

Gly Asn Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala Ala
260 265 270

Ala Gln

<210> 18

<211> 275

<212> PRT

<213> Bacillus pumilus

<400> 18

Ala Gln Ser Val Pro Tyr Gly Ile Ser Gln Ile Lys Ala Pro Ala Leu
1 5 10 15

His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp
20 25 30

Ser Gly Ile Asp Ser Ser His Pro Asp Leu Asn Val Arg Gly Gly Ala
35 40 45

Ser Phe Val Pro Ser Glu Thr Asn Pro Tyr Gln Asp Gly Ser Ser His
50 55 60

Gly Thr His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly
65 70 75 80

Val Leu Gly Val Ala Pro Ser Ala Ser Leu Tyr Ala Val Lys Val Leu
85 90 95

Asp Ser Thr Gly Ser Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu
100 105 110

Trp Ala Ile Ser Asn Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly
115 120 125

Pro Thr Gly Ser Thr Ala Leu Lys Thr Val Val Asp Lys Ala Val Ser
130 135 140

Ser Gly Ile Val Val Ala Ala Ala Ala Gly Asn Glu Gly Ser Ser Gly
145 150 155 160

Ser Thr Ser Thr Val Gly Tyr Pro Ala Lys Tyr Pro Ser Thr Ile Ala
165 170 175

Val Gly Ala Val Asn Ser Ala Asn Gln Arg Ala Ser Phe Ser Ser Ala
180 185 190

Gly Ser Glu Leu Asp Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr
195 200 205

Leu Pro Gly Gly Thr Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Thr
210 215 220

Pro His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys His Pro Thr
225 230 235 240

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Trp Thr Asn Ala Gln Val Arg Asp Arg Leu Glu Ser Thr Ala Thr Tyr
245 250 255

Leu Gly Ser Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala
260 265 270

Ala Ala Gln
275

<210> 19

<211> 380

<212> PRT

<213> Bacillus amyloliquefaciens

<400> 19

Met Arg Gly Lys Lys Val Trp Ile Ser Leu Leu Phe Ala Leu Ala Leu
1 5 10 15

Ile Phe Thr Met Ala Phe Gly Ser Thr Ser Ser Ala Gln Ala Ala Gly
20 25 30

Lys Ser Asn Gly Glu Lys Lys Tyr Ile Val Gly Phe Gln Thr Met Ser
35 40 45

Thr Met Ser Ala Ala Lys Lys Lys Asp Val Ile Ser Glu Lys Gly Gly
50 55 60

Lys Val Gln Lys Gln Phe Lys Tyr Val Asp Ala Ala Ser Ala Thr Leu
65 70 75 80

Asn Glu Lys Ala Val Lys Glu Leu Lys Lys Asp Pro Ser Val Ala Tyr
85 90 95

Val Glu Glu Asp His Val Ala His Ala Tyr Ala Gln Ser Val Pro Tyr
100 105 110

Gly Val Ser Gln Ile Lys Ala Pro Ala Leu His Ser Gln Gly Tyr Thr
115 120 125

Gly Ser Asn Val Lys Val Ala Val Ile Asp Ser Gly Ile Asp Ser Ser
130 135 140

His Pro Asp Leu Lys Val Ala Gly Gly Ala Ser Met Val Pro Ser Glu
145 150 155 160

Thr Asn Pro Phe Gln Asp Asn Asn Ser His Gly Thr His Val Ala Gly
165 170 175

Thr Val Ala Ala Leu Asn Asn Ser Ile Gly Val Leu Gly Val Ala Pro
180 185 190

Ser Ala Ser Leu Tyr Ala Val Lys Val Leu Gly Ala Asp Gly Ser Gly
195 200 205

Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu Trp Ala Ile Ala Asn Asn
210 215 220

Met Asp Val Ile Asn Met Ser Leu Gly Gly Pro Ser Gly Ser Ala Ala
225 230 235 240

Leu Lys Ala Val Asp Lys Ala Val Ala Ser Gly Val Val Val Val Ala
245 250 255

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Ala Ala Gly Asn Glu Gly Thr Ser Gly Ser Ser Ser Thr Val Gly Tyr
260 265 270

Pro Gly Lys Tyr Pro Ser Val Ile Ala Val Gly Ala Val Asp Ser Ser
275 280 285

Asn Gln Arg Ala Ser Phe Ser Ser Val Gly Pro Glu Leu Asp Val Met
290 295 300

Ala Pro Gly Val Ser Ile Gln Ser Thr Leu Pro Gly Asn Lys Tyr Gly
305 310 315 320

Ala Tyr Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly Ala Ala
325 330 335

Ala Leu Ile Leu Ser Lys His Pro Asn Trp Thr Asn Thr Gln Val Arg
340 345 350

Ser Ser Leu Glu Asn Thr Thr Thr Lys Leu Gly Asp Ser Phe Tyr Tyr
355 360 365

Gly Lys Gly Leu Ile Asn Val Gln Ala Ala Ala Gln
370 375 380

<210> 20
<211> 382
<212> PRT
<213> Bacillus amyloliquefaciens

<400> 20

Met Ile Ser Leu Leu Phe Ala Leu Ala Leu Ile Phe Thr Met Ala Phe
1 5 10 15

Gly Ser Thr Ser Ser Ala Gln Ala Ala Gly Lys Ser Asn Gly Glu Lys
20 25 30

Lys Tyr Ile Val Gly Phe Lys Gln Thr Met Ser Thr Met Ser Ala Ala
35 40 45

Lys Lys Lys Asp Val Ile Ser Glu Lys Gly Gly Lys Val Gln Lys Gln
50 55 60

Phe Lys Tyr Val Asp Ala Ala Ser Ala Thr Leu Asn Glu Lys Ala Val
65 70 75 80

Lys Glu Leu Lys Lys Asp Pro Ser Val Ala Tyr Val Glu Glu Asp His
85 90 95

Val Ala His Ala Tyr Ala Gln Ser Val Pro Tyr Gly Val Ser Gln Ile
100 105 110

Lys Ala Pro Ala Leu His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys
115 120 125

Val Ala Val Ala Val Ile Asp Ser Gly Ile Asp Ser Ser His Pro Asp
130 135 140

Leu Lys Val Ala Gly Gly Ala Ser Met Val Pro Ser Glu Thr Asn Pro
145 150 155 160

Phe Gln Asp Asn Asn Ser His Gly Thr His Val Ala Gly Thr Val Ala
165 170 175

Ala Leu Asn Asn Ser Ile Gly Val Leu Gly Val Ala Pro Ser Ala Ser

180

185

190

Leu Tyr Ala Val Lys Val Leu Gly Ala Asp Gly Ser Gly Gln Tyr Ser
 195 200 205

Trp Ile Ile Asn Gly Ile Glu Trp Ala Ile Ala Asn Asn Met Asp Val
 210 215 220

Ile Asn Met Ser Leu Gly Gly Pro Ser Gly Ser Ala Ala Leu Lys Ala
 225 230 235 240

Ala Val Asp Lys Ala Val Asp Lys Ala Val Ala Ser Gly Val Val Val
 245 250 255

Val Ala Ala Ala Gly Asn Glu Gly Thr Ser Gly Ser Ser Ser Thr Val
 260 265 270

Gly Tyr Pro Gly Lys Tyr Pro Ser Val Ile Ala Val Gly Ala Val Asp
 275 280 285

Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Val Gly Pro Glu Leu Asp
 290 295 300

Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr Leu Pro Gly Asn Lys
 305 310 315 320

Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly
 325 330 335

Ala Ala Ala Leu Ile Leu Ser Lys His Pro Asn Trp Thr Asn Thr Gln
 340 345 350

Val Arg Ser Ser Leu Glu Asn Thr Thr Thr Lys Leu Gly Asp Ser Phe
 355 360 365

Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala Ala Ala Gln
 370 375 380

<210> 21

<211> 279

<212> PRT

<213> Bacillus amyloliquefaciens

<400> 21

Ala Gln Ser Val Pro Tyr Gly Val Ser Gln Ile Lys Ala Pro Ala Leu
 1 5 10 15

His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp
 20 25 30

Ser Gly Ile Asp Ser Gly Ile Asp Ser Ser His Pro Asp Leu Lys Val
 35 40 45

Ala Gly Gly Ala Ser Met Val Pro Ser Glu Thr Asn Pro Phe Gln Asp
 50 55 60

Asn Asn Ser His Gly Thr His Val Ala Gly Thr Val Ala Ala Leu Asn
 65 70 75 80

Asn Ser Ile Gly Val Leu Gly Val Ala Pro Ser Ala Ser Leu Tyr Ala
 85 90 95

Val Lys Val Leu Gly Ala Asp Gly Ser Gly Gln Tyr Ser Trp Ile Ile
 100 105 110

[illegible]

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<210> 22
<211> 267
<212> PRT
<213> Bacillus amyloliquefaciens
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Ala Ala Val Asp Lys Ala Val Ala Ser Gly Val Val Val Val Ala Ala
130 135 140

Ala Gly Asn Glu Gly Thr Ser Gly Ser Ser Ser Thr Val Gly Tyr Pro
145 150 155 160

Gly Lys Tyr Pro Ser Val Ile Ala Val Gly Ala Val Asp Ser Ser Asn
165 170 175

Gln Arg Ala Ser Phe Ser Ser Val Gly Pro Glu Leu Asp Val Met Ala
180 185 190

Pro Gly Val Ser Ile Gln Ser Thr Leu Pro Phe Asn Lys Tyr Gly Ala
195 200 205

Lys Ser Gly Thr Cys Met Ala Ser Pro His Val Ala Gly Ala Ala Ala
210 215 220

Leu Ile Leu Ser Lys His Pro Asn Trp Thr Asn Thr Gln Val Arg Ser
225 230 235 240

Ser Leu Glu Asn Thr Thr Thr Lys Leu Gly Asp Ser Phe Tyr Tyr Gly
245 250 255

Lys Gly Leu Ile Asn Val Gln Ala Ala Ala Gln
260 265

<210> 23
<211> 275
<212> PRT
<213> Bacillus amyloliquefaciens

<400> 23

Ala Gln Ser Val Pro Tyr Gly Val Ser Gln Ile Lys Ala Pro Ala Leu
1 5 10 15

His Ser Gln Gly Tyr Cys Gly Ser Asn Val Lys Val Ala Val Ile Asp
20 25 30

Ser Gly Ile Asp Ser Ser His Pro Asp Leu Lys Val Ala Gly Gly Ala
35 40 45

Ser Phe Val Pro Ser Glu Thr Asn Pro Phe Gln Asp Asn Asn Ser His
50 55 60

Gly Thr His Val Ala Gly Thr Val Ala Ala Leu Asn Asn Ser Ile Gly
65 70 75 80

Val Leu Gly Val Ala Pro Cys Ala Ser Leu Tyr Ala Val Lys Val Leu
85 90 95

Gly Ala Asp Gly Ser Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu
100 105 110

Trp Ala Ile Ala Asn Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly
115 120 125

Pro Ser Gly Ser Ala Ala Leu Lys Ala Ala Val Asp Lys Ala Val Ala
130 135 140

Ser Gly Val Val Val Val Ala Ala Ala Gly Asn Glu Gly Thr Ser Gly
145 150 155 160

Ser Ser Ser Thr Val Gly Tyr Pro Ala Lys Tyr Pro Ser Val Ile Ala

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165          170          175
Val Gly Ala Val Asp Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Val
180          185          190

Gly Pro Glu Leu Asp Val Met Ala Pro Gly Val Ser Ile Cys Ser Thr
195          200          205

Leu Pro Gly Asn Lys Tyr Gly Ala Lys Ser Gly Thr Ser Met Ala Ser
210          215          220

Pro His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys His Pro Asn
225          230          235

Trp Thr Asn Thr Gln Val Arg Ser Ser Leu Glu Asn Thr Thr Thr Lys
245          250          255

Leu Gly Asp Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala
260          265          270

Ala Ala Gln
275

<210> 24
<211> 371
<212> PRT
<213> Bacillus halodurans

<400> 24

Met Lys Arg Arg Val His Leu Ile Met Thr Ile Leu Met Ile Val Leu
1      5      10      15

Ala Thr Gly Thr Ala Phe Ala Asp Asn Arg Glu Asp Thr Glu Asp Thr
20     25     30

Glu Glu Tyr Leu Val Gly Phe Lys Asn Glu Ala Ala Val Gln Ala Phe
35     40     45

Ser Asn Asn Val Thr Thr Ser Ala Val Glu Val Gln His Glu Tyr Glu
50     55     60

Asn Leu Pro Val Ile Val Ser Glu Leu Ser Thr Glu Val Ala Gln Leu
65     70     75     80

Leu Glu Asn Asp Pro Ser Val Glu Phe Ile Glu Lys Asn Glu Arg Val
85     90     95

Tyr Leu Asp Pro Leu Val Met Asn Asn Ile Gln Glu Thr Asp Ile Pro
100    105    110

Lys Leu Glu Glu Arg Met Lys Arg Gly Asp Gly Val Lys Ile Ala Val
115    120    125

Leu Asp Thr Gly Ile Ala Ser His Asp Asp Leu His Val Ile Asp Gly
130    135    140

Val Ser Phe Val Ser Val Glu Pro Phe Tyr Arg Asp Leu Asn Gly His
145    150    155    160

Gly Thr His Val Ala Gly Thr Ile Ala Ala Gln Glu Asn Asp Glu Ala
165    170    175

Ser Thr Gly Ile Ala Pro Asn Val Glu Leu Tyr Ala Val Lys Val Leu
180    185    190

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Asn Gly Leu Gly Ala Gly Ser Ile Ala Ser Ile Thr Asn Gly Val Asp
 195 200 205
 Trp Ala Ile Ser Asn Asp Met Asp Ile Ile Asn Met Ser Leu Gly Thr
 210 215 220
 Asn Thr Asp Ser Glu Ala Leu Gln Arg Ala Val Glu Arg Ala His Asp
 225 230 235 240
 His Gly Ile Leu Ile Ile Ala Ala Ala Gly Asn Ser Gly Glu Ala Asp
 245 250 255
 Lys Gln His Thr Ile Asp Tyr Pro Ala Arg Tyr Asp Ser Val Val Ala
 260 265 270
 Val Gly Ala Val Asp Gly Asn Asn Glu Arg Ala Ser Phe Ser Ser Tyr
 275 280 285
 Gly Glu Gln Leu Glu Ile Met Ala Pro Gly Val Glu Ile His Ser Thr
 290 295 300
 Phe Leu Phe Asn Arg Tyr Glu Arg Leu Ser Gly Thr Ser Met Ala Ser
 305 310 315 320
 Pro His Val Thr Gly Ala Ala Ala Leu Ile Lys Ser Asn Asn Pro Glu
 325 330 335
 Leu Thr Asn Glu Gln Ile Arg Lys Arg Leu Asn Thr Thr Ala Thr Pro
 340 345 350
 Leu Gly Asn Pro Phe Tyr Tyr Gly His Gly Leu Leu Asn Val Asp Ala
 355 360 365
 Ala Leu Asp
 370
 <210> 25
 <211> 435
 <212> PRT
 <213> Bacillus smithii
 <400> 25
 Met Lys Lys Phe Lys Arg Lys Gly Arg Leu Leu Asp Glu Lys His Glu
 1 5 10 15
 Met Ala Ile Phe Phe Leu Phe Leu Leu Val Ile Leu Pro Phe Lys Ala
 20 25 30
 Tyr Gly Ala Glu Ser Asp Glu Tyr Met Ile Leu Phe Arg His His Ile
 35 40 45
 Asp Asp Gly Ile Leu Lys Lys Tyr Asp Ile His Ala Gln Lys Lys Tyr
 50 55 60
 Glu Thr Ile Pro Thr Val Leu Ala Glu Leu Asn Lys Ser Gln Val Asp
 65 70 75 80
 Lys Leu Arg Ser Glu Pro Glu Ile Ala Lys Val Gln Ala Asn Lys Thr
 85 90 95
 Tyr Lys Val Gln Ser Gln Ile Glu Thr Trp Gly Tyr Lys Lys Ile Tyr
 100 105 110

Glu Asp Ser Gln Tyr Arg Ser Pro Phe Thr Gly Lys Gly Val Lys Val
 115 120 125
 Ala Val Ile Asp Thr Gly Ile Ala Ser Asn His Pro Asp Leu Lys Val
 130 135 140
 Lys Gly Gly Thr Cys Val Ile Arg Ser Asp Cys Gly Lys Gly Tyr Asn
 145 150 155 160
 Asp Asp Asn Gly His Thr His Val Ala Gly Ile Ile Gly Ala Leu Asp
 165 170 175
 Asn Gly Val Gly Ile Val Gly Val Ala Pro Asp Ala Asp Leu Tyr Ala
 180 185 190
 Val Lys Ala Phe Asp Glu Phe Gly Glu Gly Ser Thr Ser Ser Ile Thr
 195 200 205
 Ala Gly Val Asp Trp Ala Ile Gln His His Met Asp Ile Ile Asn Leu
 210 215 220
 Ser Val Thr Thr Val Ser Asp Asp Pro Val Leu Lys Ser Ala Leu Asp
 225 230 235 240
 Lys Ala Tyr Asn Ala Gly Ile Leu Ile Thr Ala Ala Ala Asn Asp Gly
 245 250 255
 Asp Ser Val Gly Ser Lys Asn Thr Ile Leu Tyr Pro Ala Lys Tyr Ser
 260 265 270
 Ser Val Ile Ala Val Gly Ser Val Asp Ser Arg Leu Gln Arg Leu Pro
 275 280 285
 Phe Ser Ala Thr Gly Pro Glu Leu Glu Ile Val Ala Pro Gly Gln Tyr
 290 295 300
 Val Phe Ser Thr Phe Pro Ile Asn Leu Asp Thr Thr Asp Gly Lys Lys
 305 310 315 320
 Asp Gly Tyr Thr Ala Leu Ser Gly Thr Ser Met Ala Leu Pro His Leu
 325 330 335
 Tyr Thr Gly Ala Leu Ala Ala Thr Leu Lys Thr Ser Ile Lys Thr Asn
 340 345 350
 Arg Pro Ala Gly Asn Pro Gln Asn Thr Ser Asp Gln Asn Ala Lys Asp
 355 360 365
 Leu Gly Thr Ala Gly Lys Asp Ser Leu Tyr Gly Tyr Gly Leu Val Gln
 370 375 380
 Ile Lys Thr Phe Gln Pro Thr Leu Ser Ser Asp Met Ala Val Lys Ala
 385 390 395 400
 Val Lys Ala Asp Asn Gly Leu Trp Ser Ser Arg Ser Ile Ser Pro Ile
 405 410 415
 Pro Phe Lys Ser Leu Ala Glu Lys Lys Arg Arg Asn Gly Gly Arg His
 420 425 430
 Tyr Lys Gln
 435

<210> 26
 <211> 648

<212> PRT

<213> Bacillus subtilis

<400> 26

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Met Lys Asn Met Ser Cys Lys Leu Val Val Ser Val Thr Leu Phe Phe
 1      5      10      15

Ser Phe Leu Thr Ile Gly Pro Leu Ala His Ala Gln Asn Ser Ser Glu
 20      25      30

Lys Glu Val Ile Val Val Tyr Lys Asn Lys Ala Gly Lys Glu Thr Ile
 35      40      45

Leu Asp Ser Asp Ala Asp Val Glu Gln Gln Tyr Lys His Leu Pro Ala
 50      55      60

Val Ala Val Thr Ala Asp Gln Glu Thr Val Lys Glu Leu Lys Gln Asp
 65      70      75      80

Pro Asp Ile Leu Tyr Val Glu Asn Asn Val Ser Phe Thr Ala Ala Asp
 85      90      95

Ser Thr Asp Phe Lys Val Leu Ser Asp Gly Thr Asp Thr Ser Asp Asn
100      105      110

Phe Glu Gln Trp Asn Leu Glu Pro Ile Gln Val Lys Gln Ala Trp Lys
115      120      125

Ala Gly Leu Thr Gly Lys Asn Ile Lys Ile Ala Val Ile Asp Ser Gly
130      135      140

Ile Ser Pro His Asp Asp Leu Ser Ile Ala Gly Gly Tyr Ser Ala Val
145      150      155      160

Ser Tyr Thr Ser Ser Tyr Lys Asp Asp Asn Gly His Gly Thr His Val
165      170      175

Ala Gly Ile Ile Gly Ala Lys His Asn Gly Tyr Gly Ile Asp Gly Ile
180      185      190

Ala Pro Glu Ala Gln Ile Tyr Ala Val Lys Ala Leu Asp Gln Asn Gly
195      200      205

Ser Gly Asp Leu Gln Ser Leu Leu Gln Gly Ile Asp Trp Ser Ile Ala
210      215      220

Asn Arg Met Asp Ile Val Asn Met Ser Leu Gly Thr Thr Ser Asp Ser
225      230      235      240

Lys Ile Leu His Asp Ala Val Asn Lys Ala Tyr Glu Gln Gly Val Leu
245      250      255

Leu Val Ala Ala Ser Gly Asn Asp Gly Asn Gly Lys Pro Val Asn Tyr
260      265      270

Pro Ala Ala Tyr Ser Ser Val Val Ala Val Ser Ala Thr Asn Glu Lys
275      280      285

Asn Gln Leu Ala Ser Phe Ser Thr Thr Gly Asp Glu Val Glu Phe Ser
290      295      300

Ala Pro Gly Thr Asn Ile Thr Ser Thr Tyr Leu Asn Gln Tyr Tyr Ala
305      310      315      320

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Thr Gly Ser Gly Thr Ser Gln Ala Thr Pro His Ala Ala Ala Met Phe
 325 330 335
 Ala Leu Leu Lys Gln Arg Asp Pro Ala Glu Thr Asn Val Gln Leu Arg
 340 345 350
 Glu Glu Met Arg Lys Asn Ile Val Asp Leu Gly Thr Ala Gly Arg Asp
 355 360 365
 Gln Gln Phe Gly Tyr Gly Leu Ile Gln Tyr Lys Ala Gln Ala Thr Asp
 370 375 380
 Ser Ala Tyr Ala Ala Ala Glu Gln Ala Val Lys Lys Ala Glu Gln Thr
 385 390 395 400
 Lys Ala Gln Ile Asp Ile Asn Lys Ala Arg Glu Leu Ile Ser Gln Leu
 405 410 415
 Pro Asn Ser Asp Ala Lys Thr Ala Leu His Lys Arg Leu Asp Lys Val
 420 425 430
 Gln Ser Tyr Arg Asn Val Lys Asp Ala Lys Asp Lys Val Ala Lys Ala
 435 440 445
 Glu Lys Tyr Lys Thr Gln Gln Thr Val Asp Thr Ala Gln Thr Ala Ile
 450 455 460
 Asn Lys Leu Pro Asn Gly Thr Asp Lys Lys Asn Lys Gln Lys Arg Leu
 465 470 475 480
 Asp Gln Val Lys Arg Tyr Ile Ala Ser Lys Gln Ala Lys Asp Lys Val
 485 490 495
 Ala Lys Ala Glu Lys Ser Lys Lys Lys Thr Asp Val Asp Ser Ala Gln
 500 505 510
 Ser Ala Ile Gly Lys Leu Pro Ala Ser Ser Glu Lys Thr Ser Leu Gln
 515 520 525
 Lys Arg Leu Asn Lys Val Lys Ser Thr Asn Thr Ala Gln Gln Ser Val
 530 535 540
 Ser Ala Ala Glu Lys Lys Ser Thr Asp Ala Asn Ala Ala Lys Ala Gln
 545 550 555 560
 Ser Ala Val Asn Gln Ser Ala Val Asn Gln Leu Gln Ala Gly Lys Asp
 565 570 575
 Lys Thr Ala Leu Gln Lys Arg Leu Asp Lys Val Lys Lys Lys Val Ala
 580 585 590
 Ala Ala Glu Ala Lys Lys Val Glu Thr Ala Lys Ala Lys Val Lys Lys
 595 600 605
 Ala Glu Lys Asp Lys Thr Lys Lys Ser Lys Thr Ser Ala Gln Ser Ala
 610 615 620
 Val Asn Gln Leu Lys Ala Ser Asn Glu Lys Thr Lys Leu Gln Lys Arg
 625 630 635 640
 Leu Asn Ala Val Lys Pro Lys Lys
 645

<210> 27

<211> 440

<212> PRT

<213> Aeropyrum pernix

<400> 27

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Met Val Ala Val Val Thr Gly Val Ile Gln Val Gly Thr Lys Ile Ala
1      5      10      15

Ala Ile Ala Ile Ala Leu Ile Phe Ile Leu Pro Leu Phe Pro Val Tyr
      20      25      30

Thr Gly Ser Ala Ala Gly Ala Ser Thr Val Val Ile Ala Lys Ile Asn
      35      40      45

Pro Glu Glu Phe Asn Pro Lys Ala Val Glu Ala Leu Gln Gly Lys Val
      50      55      60

Ile Tyr Val Ala Asp Leu Ala Pro Val Ala Ile Ile Ser Ile Pro Gly
      65      70      75      80

Lys Ala Val Gly Leu Leu Ser Lys Leu Pro Gly Val Val Ser Val Ser
      85      90      95

Glu Asp Gly Val Val Gln Ala Met Ala Lys Pro Pro Trp Ala Gly Gly
      100      105      110

Gly Asn Lys Ser Gln Pro Ala Glu Val Leu Pro Trp Gly Val Asp Tyr
      115      120      125

Ile Asp Ala Glu Leu Val Trp Pro Asp Gly Val Thr Gly Trp Val Asp
      130      135      140

Val Asn Gly Asp Gly Asp Gly Glu Ile Glu Val Ala Val Ile Asp Thr
      145      150      155      160

Gly Val Asp Lys Asp His Pro Asp Leu Ala Gly Asn Ile Val Trp Gly
      165      170      175

Ile Ser Val Leu Asn Gly Arg Ile Ser Ser Asn Tyr Gln Asp Arg Asn
      180      185      190

Gly His Gly Thr His Val Thr Gly Thr Val Ala Ala Ile Asp Asn Asp
      195      200      205

Ile Gly Val Ile Gly Val Ala His Ser Val Glu Ile Tyr Ala Val Lys
      210      215      220

Ala Leu Gly Asn Gly Gly Tyr Gly Ser Trp Ser Asp Leu Ile Ile Ala
      225      230      235      240

Ile Asp Leu Ala Val Lys Gly Pro Asp Gly Val Ile Asp Ala Asp Gly
      245      250      255

Asp Gly Val Val Ala Gly Asp Pro Asp Asp Ala Pro Glu Val Ile
      260      265      270

Ser Met Ser Leu Gly Gly Ser Ser Pro Pro Pro Glu Leu His Asp Val
      275      280      285

Ile Lys Ala Ala Tyr Asn Leu Gly Ile Thr Ile Val Ala Ala Ala Gly
      290      295      300

Asn Asp Gly Ala Asp Ser Pro Ser Tyr Pro Ala Ala Tyr Pro Glu Val
      305      310      315      320

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Ile Ala Val Gly Ala Ile Asp Glu Asn Gly Asn Val Pro Ser Trp Ser
 325 330 335
 Asn Arg Asn Pro Glu Val Ala Ala Pro Gly Val Asn Ile Leu Ser Thr
 340 345 350
 Tyr Pro Asp Asp Thr Tyr Glu Glu Leu Ser Gly Thr Ser Met Ala Thr
 355 360 365
 Pro His Val Ser Gly Thr Val Ala Leu Ile Gln Ala Ala Arg Leu Ala
 370 375 380
 Ala Gly Leu Pro Leu Leu Pro Pro Gly Ser Glu Ser Asp Thr Thr Pro
 385 390 395 400
 Asp Thr Val Arg Gly Val Leu His Thr Thr Ala Thr Asp Ala Gly Asp
 405 410 415
 Pro Gly Tyr Asp Ser Leu Tyr Gly Tyr Gly Ile Ile Asp Ala Tyr Asp
 420 425 430
 Ala Val Gln Thr Ala Val Ser Ser
 435 440

<210> 28
 <211> 554
 <212> PRT
 <213> Bacillus halodurans

<400> 28

Met Lys Thr Met Lys Thr Leu Val Ile Val Ile Gly Val Leu Ala Leu
 1 5 10 15
 Leu Phe Ile Val Ala Ile Gly His Val Arg Asp Gln Asp Gln Ala Leu
 20 25 30
 Ile Gln Thr Lys Glu Ile Pro Lys Thr Leu Glu Thr Glu Ala Met Asp
 35 40 45
 His Leu Leu Ala Glu Asp Leu Ser Leu Thr Thr Ser Met Phe Ile Lys
 50 55 60
 Gln Met Ala Glu Gln Leu Gln Arg Trp Ser Glu Gln Leu Glu Glu Asp
 65 70 75 80
 Pro Thr Ile Lys Asp Glu Phe Arg Gln Gln Ile Asp Glu His Pro His
 85 90 95
 Met Gln Phe Ala Ile Ala Glu Ala Asn Lys Ile Thr Gln Lys Val Gly
 100 105 110
 Thr Leu His Arg Asp Asp Val Lys Ala Leu Thr His Val His His Asn
 115 120 125
 Gln Arg Tyr Ser Asp Pro Tyr Asn Val Asp Asp Ser Thr Tyr Met Leu
 130 135 140
 Ile Gly Glu Ser Thr Asp Asp Gly Arg Leu Leu Ile Gly Glu Leu Asn
 145 150 155 160
 Leu Glu Phe Val Lys Lys Tyr Val Lys Asp Ile Ala Ala Val Ala Asp
 165 170 175
 Thr Asn Gly Asn Phe Phe Ile Gly Gly Asp Asn Pro Asp Val Ser Trp

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180										185										190										
Gln	Asp	Gln	Asp	Glu	Arg	Ala	Thr	Gln	Leu	Thr	Ser	Glu	Thr	Val	Pro															
		195					200					205																		
Glu	Leu	Gly	Trp	Asp	Ile	His	Val	Gln	Ser	Glu	Gly	Gln	Glu	Glu	Glu															
	210					215					220																			
Gly	Pro	Ala	Tyr	His	Glu	His	Gln	Ala	Val	Ile	Arg	Phe	Lys	Pro	Asn															
225					230					235					240															
Arg	Asp	Pro	Ala	Ala	Trp	Phe	Ala	Thr	Asn	Pro	Tyr	Arg	Val	Val	Glu															
				245					250					255																
Glu	Ala	Pro	Pro	Phe	Phe	Val	Ile	Glu	Ser	Pro	Asn	Gln	Thr	Thr	Val															
			260					265					270																	
Glu	Ile	Val	Glu	Ala	Leu	Ser	Arg	Asp	Tyr	Asp	Leu	Asp	Phe	Ala	Glu															
	275						280					285																		
Pro	Asn	Tyr	Arg	Phe	Thr	Lys	Gln	Ile	Gln	Ala	Pro	Val	Thr	Pro	Asn															
	290					295					300																			
Asp	Glu	Phe	Phe	Lys	Glu	Tyr	Gln	Trp	Asn	Leu	Gln	Gln	Ile	Asp	Ile															
305					310					315					320															
Glu	Glu	Gly	Trp	Ser	Leu	Ala	Ser	Gly	Glu	Asn	Val	Lys	Ile	Ala	Ile															
				325					330					335																
Leu	Asp	Thr	Gly	Val	Asp	Pro	Asn	His	Pro	Asp	Ile	Lys	Asp	Lys	Ile															
			340					345					350																	
Val	Asn	Gly	Tyr	Asn	Ala	Val	Glu	Gly	Asn	Asn	Asn	Phe	Ala	Asp	Lys															
		355					360					365																		
His	Gly	His	Gly	Thr	His	Val	Ala	Gly	Val	Ala	Ala	Ala	Val	Thr	Asn															
	370					375					380																			
Asn	Val	Thr	Gly	Ile	Ala	Gly	Ile	Ser	Trp	Lys	Ser	Glu	Ile	Leu	Pro															
385					390					395					400															
Val	Lys	Val	Leu	Asn	Asp	Asn	Gly	Glu	Gly	Ser	Ser	Phe	Glu	Val	Ala															
				405					410				415																	
Lys	Gly	Ile	Tyr	Trp	Ala	Thr	Asp	His	Gly	Ala	Lys	Val	Ile	Asn	Met															
			420					425					430																	
Ser	Leu	Gly	Asp	Tyr	Tyr	His	Ser	Asp	Ala	Leu	Arg	Asp	Ala	Val	Lys															
		435					440					445																		
Tyr	Ala	Tyr	Asp	His	Asp	Val	Val	Leu	Ile	Ala	Ala	Ser	Gly	Asn	Asp															
	450					455					460																			
Asn	Val	Glu	Asp	Pro	Leu	Tyr	Pro	Ala	Ile	Tyr	Glu	Glu	Val	Leu	Thr															
465					470					475					480															
Val	Ala	Ala	Val	Asp	Asp	Thr	Arg	Asn	Arg	Ala	Phe	Phe	Ser	Asn	Phe															
				485					490					495																
Gly	Lys	His	Ile	Asp	Val	Thr	Ala	Pro	Gly	Glu	His	Ile	Pro	Asp	Leu															
			500					505					510																	
Ser	Asn	Gln	Glu	Val	Met	Asp	Ile	Met	Lys	Lys	Thr	Ala	Lys	Asp	Leu															
		515					520					525																		

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Glu Ala Ala Leu Lys Ala Ile Arg Thr Ser
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<211> 782

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<400> 29

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Glu Glu Lys Val Asp Ile Ile Val Thr Tyr Lys Asp Val Val Ser Glu
35 40 45

Ser Pro Asp Ser Arg Leu Ser Val Tyr Glu Asn Glu Gln Thr Met Lys
50 55 60

Thr Leu Pro Ile Lys Thr Met Thr Val Pro Val Ser Glu Val Glu Arg
65 70 75 80

Leu Lys Glu Asp Pro Asn Val Val Ser Val Ser Leu Asp Gln Pro Leu
85 90 95

Gln Leu Met Ser Asp Thr Arg Glu Leu Gly Glu His Asp Trp Asn Asn
100 105 110

Asp Met Val Lys Ala Phe Asp Ala Trp Asp Asp Gly Tyr Thr Gly Lys
115 120 125

Gly Val Lys Val Ala Val Phe Asp Thr Gly Phe Asp Gly His Gln Asp
130 135 140

Ile Thr Tyr Ala Gly Gly His Ser Val Phe Glu Gly Glu Pro Tyr Thr
145 150 155 160

His Asp His His Gly His Gly Thr His Val Ala Gly Ile Ile Ala Gly
165 170 175

Ala Arg Glu Gly Thr Leu His Gln Gly Ile Ala Pro Asp Val Gln Leu
180 185 190

Tyr Gly Val Lys Val Phe Ser Gln Glu Lys Gly Gly Asn Thr Ser Asp
195 200 205

Leu Ile Ala Gly Ile Asp Trp Ala Ile Gln Glu Gly Met Asp Ile Ile
210 215 220

Asn Met Ser Leu Gly Tyr Thr Asn Glu Val Pro Ala Val His Thr Ala
225 230 235 240

Ile Lys Gln Ala Val Ala Gln Glu Ile Leu Val Val Ala Ala Ser Gly
245 250 255

Asn Gly Gly Lys Ala Asp Gly Ser Gly Glu Thr Ile Glu Tyr Pro Ala
260 265 270

Lys Tyr Asp Glu Val Ile Ala Val Ala Ser Val Asp Lys Glu Met Lys

275

280

285

Arg	Thr	Asn	Thr	Ser	Ala	Thr	Gly	Val	Glu	Asn	Glu	Leu	Ala	Ala	Pro
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Gly	His	Leu	Ile	Gly	Gly	Leu	Ala	Pro	Gly	Asn	Lys	Tyr	Val	Phe	Met
305				310						315					320
Ser	Gly	Thr	Ser	Gln	Ala	Thr	Pro	His	Val	Thr	Ser	Leu	Ala	Ala	Ile
				325					330					335	
Ile	Met	Gly	Lys	His	Pro	Glu	Leu	Ser	Ser	Gln	Gln	Ile	Arg	Ala	Leu
			340					345					350		
Leu	Val	Glu	Gln	Ser	Leu	Asp	Leu	Gly	Ser	Glu	Gly	His	Asp	Arg	Leu
		355					360					365			
Tyr	Gly	Tyr	Gly	Leu	Ala	Gln	Tyr	Val	Ser	Ser	Thr	Pro	Pro	Asp	Glu
	370					375					380				
Glu	Glu	Asn	Glu	Glu	Ser	Pro	Ala	Glu	Asn	Pro	Gln	Glu	Gln	Pro	Ser
385					390					395					400
Asp	Gly	Lys	Glu	Asn	Glu	Gly	Ser	Glu	Asp	Gln	Gly	Ser	Thr	Pro	Pro
				405					410					415	
Asp	Glu	Glu	Glu	Asn	Glu	Glu	Ser	Pro	Ala	Glu	Asp	Pro	Gln	Glu	Gln
			420					425					430		
Pro	Ser	Asp	Gly	Lys	Glu	Asn	Lys	Gly	Ser	Glu	Asn	Gln	Gly	Ser	Thr
		435					440					445			
Pro	Pro	Asp	Glu	Glu	Glu	Asn	Glu	Glu	Ser	Pro	Ala	Glu	Val	Pro	Gln
	450					455					460				
Glu	Gln	Pro	Ser	Asp	Gly	Lys	Glu	Asn	Glu	Gly	Ser	Glu	Asp	Gln	Gly
465					470					475					480
Ser	Thr	Pro	Pro	Asp	Glu	Glu	Glu	Asn	Glu	Glu	Ser	Pro	Ala	Glu	Asp
				485					490					495	
Pro	Gln	Glu	Gln	Pro	Ser	Asp	Lys	Glu	Asn	Glu	Glu	Ser	Lys	Asn	Pro
			500					505					510		
Asp	Ser	Ala	Pro	Pro	Ala	Gly	Glu	Lys	Lys	Glu	Gly	Lys	Gln	Thr	Ala
		515					520					525			
Arg	Val	Gln	Val	Lys	Pro	Val	Asn	Leu	Gly	Gly	Val	Ala	Ile	Val	Ser
	530					535					540				
Asn	Ala	Asp	Val	Ala	Ser	Val	Leu	Asp	Asn	Asn	Gly	Thr	Leu	Val	Val
545					550					555					560
Phe	Phe	Asp	Ser	Ala	Leu	Asp	Asp	Leu	Thr	Arg	Leu	Ala	Leu	Thr	Ala
				565					570					575	
Asp	Gln	Val	Lys	Glu	Leu	Lys	Asp	Arg	Gly	Ile	Thr	Leu	Val	Ile	Ala
			580					585					590		
Lys	His	Asp	Glu	Leu	Val	Ile	Pro	His	Gly	Val	Phe	Lys	Ala	Gly	Asp
		595					600					605			
Val	Val	Ile	Glu	Phe	Glu	Arg	Val	Val	Gly	Lys	Gly	Ile	Pro	Tyr	Ala
	610					615					620				

Gly Gln Ala Lys Ser Thr Val Tyr Gln Phe Lys Ile Ile Gln Asn Gly
625 630 635 640

Gln Gln Val Arg His Phe Asp Glu Glu Ile Glu Met Gly Phe Arg Val
645 650 655

Asp Gln Glu Lys Asn Val Asn Asn Leu Lys Ile Tyr Tyr Trp Asn Glu
660 665 670

Ser Leu Asn Glu Trp Glu Lys Ile Gly Gly Asn Tyr Gln Glu Gly Phe
675 680 685

Ile Val Ala Arg Thr Asn Phe Glu Glu Thr Lys Ser Gly Thr Pro Ile
690 695 700

Ser Gly Gly Lys Thr Asn Gly Asn Ser Thr Thr Glu Gly Thr Thr Asn
705 710 715 720

Arg Gly Thr Ser Lys Asn Gly Thr Gly Ser Glu Pro Gln Ala Glu Glu
725 730 735

Ser Asn Asn Glu Gln Asn Asn Lys Asp Gly Thr Leu Pro Lys Thr Ala
740 745 750

Thr Asn Leu Tyr Asn Ser Leu Ala Ile Gly Ala Leu Leu Leu Leu Ile
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Gly Phe Val Leu Leu Arg Lys Ser Lys Arg Arg Ile Val Glu
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<210> 32
<211> 60
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<220>
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aagagtgcc a tgcccgaagg ttatgtacag gaaagaacta 100

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<210> 38
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<210> 45
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<210> 53

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<210> 77
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<212> DNA
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<210> 82
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<210> 83
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<210> 84
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<400> 85

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60

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